VENT NOVAMETRIX MECHANICS

HANDHELD RESPIRATORY MECHANICS MONITOR

User's Manual

VentCheck™
Model 101

October 30, 1997

Catalog No. 6800-23-02

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About this manual

This manual is written for clinical personnel using the *VENT✔* (VentCheck™) Handheld Respiratory Mechanics Monitor, Model 101, and the flow sensors and accessories intended for use with the monitor.

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VENT✔ Technical Description

Per requirements of IEC 601-1, *VENT✔* is classified as class II equipment, internally powered, with type BF applied part, and an enclosure protection rating of IPX1.

Transport/Storage: -10 to +55° C (14-131° F), 10-95% R.H. non-condensing
Operating Conditions: +10 to +40° C (50-104° F), 10-90% R.H. non-condensing

The *VENT✔* (VentCheck™) Handheld Respiratory Mechanics Monitor, Model 101, contains no user serviceable parts. Refer servicing to qualified service personnel. (See "Accessories" on page 21 for listings of the Service Manual and Service Test kit for use by technical personnel.)

Declaration of Conformity with European Union Directive

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General Description

The *VENT✔* (VentCheck™) Handheld Respiratory Mechanics Monitor, Model 101, from Novametrix Medical Systems Inc., is an easy-to-operate stand-alone respiratory mechanics monitor. It is intended to be used in patient monitoring environments by technically skilled clinical personnel.

Indications for Use

VENT✔ is indicated for use by technically skilled clinical personnel as a mechanics monitor for mechanically ventilated or spontaneously breathing persons in monitoring environments including the intensive care unit (ICU), the operating room (OR) and in emergency/transport care. The device is intended for short-term use (nominally 1 hour) and is NOT intended for continuous monitoring.

VENT✔ compatible flow sensors are a single patient use devices having fittings that comply with ISO 5356-1 and may be used in conjunction with endotracheal tubes, face masks, and breathing circuit devices that also comply with the specification.

Pediatric/adult flow sensors are indicated for use with endotracheal tubes with internal diameters of ≥6 mm. Neonatal flow sensors are indicated for use with endotracheal tubes with internal diameters of ≤4 mm. Further, for endotracheal tubes with internal diameters of 4.5 to 5.5 mm, in general, neonatal sensors are indicated if the patient weight <10 kg or tidal volume <100 ml, and pediatric/adult sensors are indicated where patient weight ≥10 kg and tidal volume ≥100 ml.

Contra-indications

VENT✔ is intended for short-term use (nominally 1 hour) and is NOT intended as a continuous monitoring device.

VENT✔ does NOT compensate for the presence of high oxygen concentrations, anesthetic gases or helium-oxygen mixtures. When such mixtures are present, errors in flow measurements may exist.

Principles of Operation

VENT✔ measures the respiratory parameters of flow and pressure. Many other parameters are calculated from the flow and pressure signals, including: volume (tidal and minute), airway resistance, and lung compliance. *VENT✔* uses fixed-orifice, differential pressure pneumotachs. The pneumotach is the airway flow sensor that converts volumetric flow rate into a differential pressure signal. Gas flowing through the flow sensor causes a small pressure drop across the two ports connected to the sensor. This pressure drop is transmitted through the tubing to the monitor where differential and absolute pressure transducers are located.

This pressure drop is correlated to flow according to the factory stored calibration. (The relationship between the volumetric flow-rate and the resulting differential pressure is governed by standard fluid mechanics equations.) User calibration is not required because of the ability of the plastic injection mold to produce precision flow sensors. Empirical calibration for the specific pneumotach type (pediatric/adult, neonatal, etc.) is performed at the factory and is stored in the monitor. The pressure transducer is automatically "zeroed" to correct for changes in ambient temperature, electronics and position (gravity effects).

Patient Safety

- Keep the *VENT✔* and its accessories clean. Do not operate the *VENT✔* when it is wet due to spills or condensation.
- Connect only Novametrix Series 3 Flow Sensors to the *VENT✔*. For maximum performance; keep the pressure sensor ports oriented upward, and keep the sensor clear of moisture and secretions by proper breathing circuit maintenance.
- Connect the sensor first to the *VENT✔* and then to the patient breathing circuit in order to limit circuit volume loss and to avoid excessive moisture build-up in the flow sensor tubing.
- *VENT✔* has electrically isolated inputs. Patient leakage current flowing from the instrument to ground is limited to less than 50 μA at 120 V, 60 Hz. Patient isolation is greater than 10 MΩ, 2500 V rms at 60 Hz.
- Where electromagnetic devices (i.e., electrocautery) are used, patient monitoring may be interrupted due to electromagnetic interference. Electromagnetic fields up to 3 V/m will not adversely affect system performance.
- *VENT✔* contains no user serviceable parts. Refer servicing to qualified service personnel. (See "Accessories" on page 21 for listings of the Service Manual and Service Test kit for use by technical personnel.)
- This product and its accessories which have patient contact are latex free.

Warnings

WARNING:

! Indicates a potentially harmful condition that can lead to personal injury.

- **Explosion Hazard:** Do NOT use the *VENT✔* in the presence of flammable anesthetics. Use of this instrument in such an environment may present an explosion hazard.
- **Electrical Shock Hazard:** Always turn the monitor off before cleaning it. Do NOT use a damaged monitor or sensor. Refer servicing to qualified service personnel.
- **Fire Hazard:** The *VENT✔* should not be exposed to elevated oxygen levels at elevated pressures. Use in such an environment may present a fire hazard.
- **Failure of Operation:** If the monitor fails to respond as described, do not use it until the situation has been corrected by qualified personnel.
- Do not apply tension to the sensor tubing while connected to a patient breathing circuit, as accidental extubation may result.
- Do not position the flow sensor's tubing in any manner that may cause entanglement or strangulation.
- Use the optional external battery charger in non-patient areas only.

Cautions

CAUTION:
Indicates a condition that may lead to equipment damage or malfunction.

- Federal (U.S.A.) law restricts this device to sale, distribution, or use by or on the order of a licensed medical practitioner.
- Electrical Shock Hazard: Always turn the monitor off before cleaning. Do NOT use a damaged monitor.
- Do NOT use a damaged flow sensor.
- Do NOT immerse the monitor or sensors in liquids.
- Do NOT sterilize the monitor or the sensors.
- No user serviceable parts inside. Refer servicing to qualified service personnel.
- Operate at temperatures between +10° C to +40° C (50-104° F), < 90% relative humidity (non-condensing).
- Avoid storing the monitor at temperatures less than -20° C or greater than +55° C (<-4° F or >131° F).

Notes

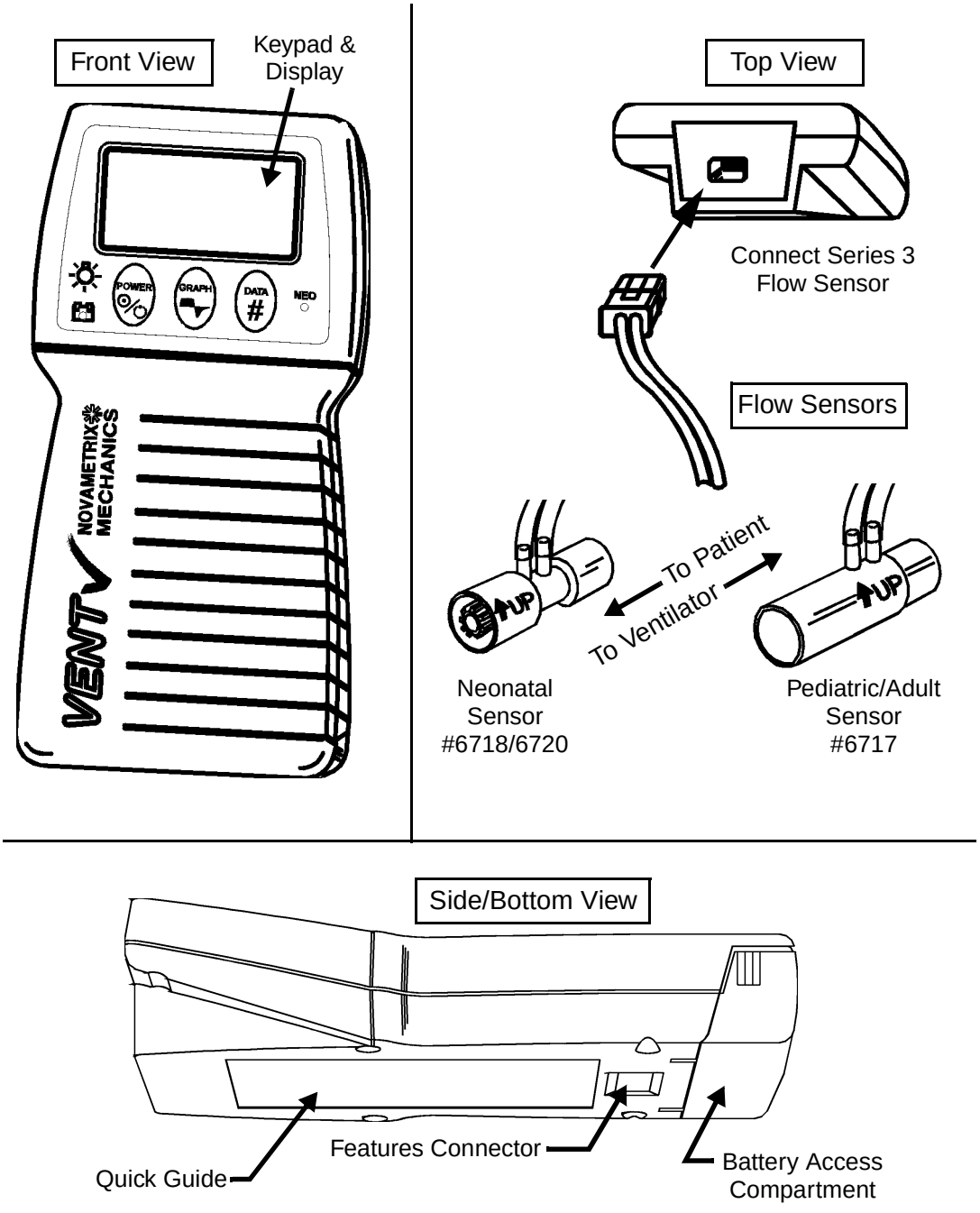
NOTE
Indicates points of particular interest or emphasis and intended to provide for more efficient or convenient operation.

- The *VENT✔* operates with Novametrix Series 3 Flow Sensors only.
- The *VENT✔* performs an automatic zero (self calibration) periodically and as needed. During this time, monitoring is interrupted for less than three seconds.
- The automatic zero can be manually initiated by simultaneously pressing the DATA and GRAPH keys. After changing the sensor from Adult to Neonatal (while the *VENT✔* is operational), wait 30 seconds then perform an automatic zero.
- This product and its accessories which have patient contact are free of latex.
- The C_{20}/C Compliance Ratio (neonatal) parameter is not supported.
- To determine the *VENT✔* software version, turn the monitor on. During the self test performed at power up, the software level is shown on the third line as "main-101-xx", where "xx" is the software version.
- Some *VENT✔* monitors were produced with the statement "Use only Novametrix approved devices, 13 VDC, 1A" located on the label at the Flow Sensor Input Connector. This erroneous statement does NOT apply to the *VENT✔* monitor and should be ignored.

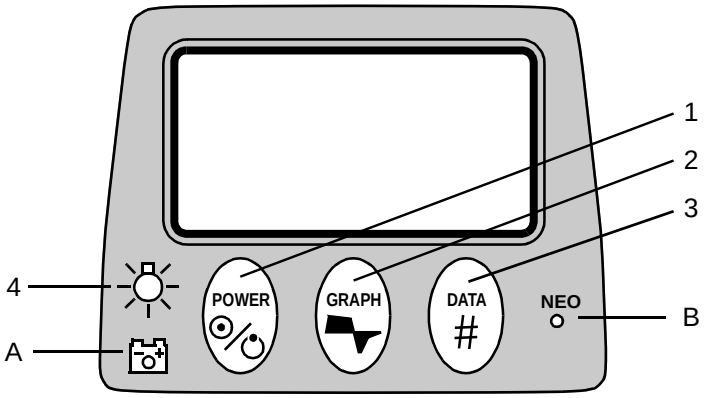
Preparation for Use

Getting Acquainted

The *VENT✔* Handheld Respiratory Mechanics Monitor, Model 101 is shown below.



Keypad Controls and Indicators



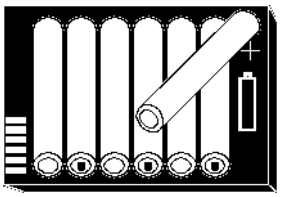
#	Key	Action	Function
1	POWER	Press	Turns *VENT✔* on/off.
2	GRAPH	Press	Display Graph Screens. Additional presses causes *VENT✔* to sequence through available Graph Screens.
3	DATA #	Press	Display Data Screens. Additional presses causes *VENT✔* to sequence through available Data Screens.
4		Press	Turns display backlight on/off.
		Press & Hold	Adjusts contrast/viewing angle of display (1 step/sec.)
A		None	Illuminated if powered from battery Green; battery charged Yellow flashing slowly; capacity getting low Red flashing quickly; exhausted in 10-15 min.
B	NEO	None	Illuminates when a Neonatal sensor is connected.

Symbols

Symbol	Description
	Patient Isolation Identifies patient isolation connection as type BF.
	Attention Consult manual for detailed information.

Power supply options

The *VENT✔* can be powered from seven "AA" disposable alkaline batteries, or a rechargeable battery. Battery capacity is shown in the chart below; it may be reduced in colder temperatures or with power cycling, and slightly increased if *VENT✔* is operated with its backlight off.

	Standard AA alkaline batteries (7 ea. - disposable)	Optional Rechargeable battery, (NiMH 7.2 vdc)
Power Source		
Capacity, continuous	8 hours	12 hours
Recharge Time	n/a	1.5 hours
Catalog Number	400038 (battery) 6862-00 (case)	400043

AA Alkaline Batteries. To power *VENT✔* from AA alkaline batteries, insert seven disposable alkaline batteries (Panasonic AM3X or equivalent) into the Battery Case (Cat. No. 6862-00) following the polarity markings on the case.

WARNING:
Do not recharge or incinerate alkaline batteries. Attempting to do so may cause the batteries to leak or explode.

Rechargeable Battery. *VENT✔* can operate from the optional Duracell® DR30 (or equivalent) rechargeable battery. If a rechargeable battery has not been used for three months or more, recharge it before use.

WARNING:
Battery can explode, leak or catch on fire if heated or exposed to fire or high temperatures.

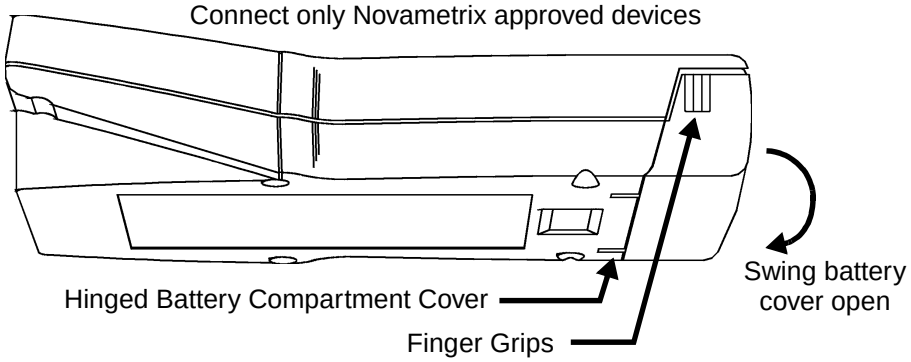
Additional Battery Information.

- Dispose of batteries in accordance with local laws.
- Do not mix battery types (e.g. disposable and rechargeable AA batteries).
- *VENT✔* may not power up if the batteries are nearly depleted.

Battery Installation

To install or remove the battery, grasp the finger grips on each end of the *VENT✔* battery cover. Squeeze together and pull so that the hinged cover opens. The battery is keyed and can be installed in only one orientation (see illustration inside

battery compartment). The contacts should go in first and be located toward the top left of the monitor. Close the battery cover before operating the monitor.



External Battery Charger

An optional external charger for the Duracell® DR30 is available. The external charger allows the battery to be recharged outside of the *VENT✔* monitor.

- The external charger is for use with the rechargeable Duracell DR-30 battery only.
- In a non-patient area, connect the external charger to an AC source. Remove the battery from the *VENT✔* and insert it into the external charger. The battery will be fully charged in approximately 1 1/2 hours.
- Refer to the instructions supplied with the charger for additional information.

WARNING:
The external battery charger should NOT be operated near or in close proximity to patients and/or other medical equipment in operation.

Features Connector

The *VENT✔* features connector is for use only with future optional Novametrix accessories. The connector meets the patient safety requirements set forth by the safety agencies as labelled on the *VENT✔* monitor.

Monitor Operation

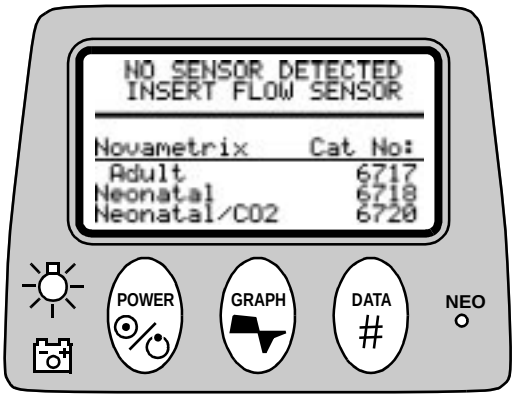
Prior to operating the *VENT✔* monitor, please note the following;

- *VENT✔* is intended for short-term use (nominally 1 hour) and is NOT intended as a continuous monitoring device.
- *VENT✔* does NOT compensate for the presence of high oxygen concentrations, anesthetic gases or helium-oxygen mixtures. When such mixtures are present, errors in flow measurements may exist.
- The *VENT✔* performs an automatic zero (self calibration) periodically and as needed. During this time, monitoring is interrupted for less than three seconds.

The instructions below assume the *VENT✔* has a charged battery installed and that no flow sensor is connected. *Use of equipment other than mentioned here may yield different results*.

Power On/Off

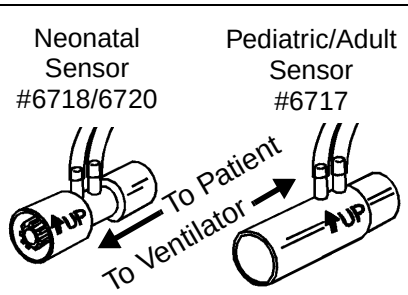
1. Press the POWER key to turn *VENT✔* on (or off).
2. Verify both the NEO and battery indicators illuminate as part of the self-test performed at power up.
3. Press and hold the LAMP key to adjust the contrast/viewing angle of the display.
4. If desired, press the LAMP key to turn the display backlight on/off.
5. Verify INSERT FLOW SENSOR message appears.



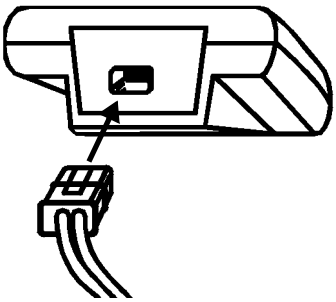
Flow Sensor

6. Select a Series 3 Flow Sensor based on the patient type.
   — #6717, Pediatric/Adult sensor adds approximately 6.5 cc of deadspace.
   — #6718/6720, Neonatal sensors add approximately 0.8 cc of deadspace.

ET Tube Size	Series 3 Flow Sensor
≥6 mm	• Pediatric/Adult
4.5 to 5.5 mm	• Pediatric/Adult if weight ≥10 kg and V_T ≥100 ml • Neonatal if weight <10 kg or V_T <100 ml
≤4 mm	Neonatal



7. Remove the sensor from the package. Verify the sensor is clean, dry and physically intact with no broken edges or disconnected tubing.
8. Connect the Flow sensor to the *VENT✔*.
   - Verify *VENT✔* briefly displays the selected sensor type.
   - Verify the NEO indicator is illuminated only if a neonatal sensor is in use.



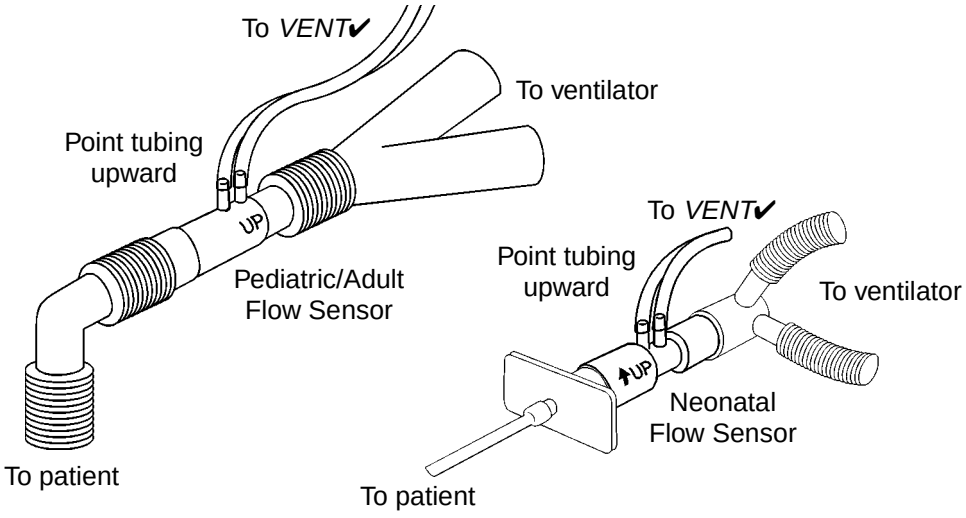
Patient Connection

9. After connecting the flow sensor to the *VENT✔*, place the flow sensor into the breathing circuit proximal to the patient.

NOTE

Connect the sensor first to the monitor and then to the patient breathing circuit in order to limit circuit volume loss and to avoid excessive moisture build-up in the flow sensor tubing.

- The sensor is best placed between the endotracheal tube and the ventilator circuit wye.
- Do NOT position the sensor between the ET tube and the elbow (pediatric/ adult circuit), as this may allow patient secretions to build up in the sensor.
- If other airway appliances (e.g., suction adapter, elbow, heat moisture exchanger (HME), CO_2 adapter, etc.) are in use, place the flow sensor in the more distal position—away from the patient—closer to the circuit wye.
- To prevent "rain-out" and moisture from draining into the sensor, do NOT place the sensor in a gravity dependent position where moisture and secretions may accumulate.
- Periodically check the flow sensor and tubing for excessive moisture and/or secretion build-up.
- After changing the sensor from Adult to Neonatal (while the *VENT✔* is operational), wait 30 seconds then perform an automatic zero by simultaneously pressing the DATA and GRAPH keys.



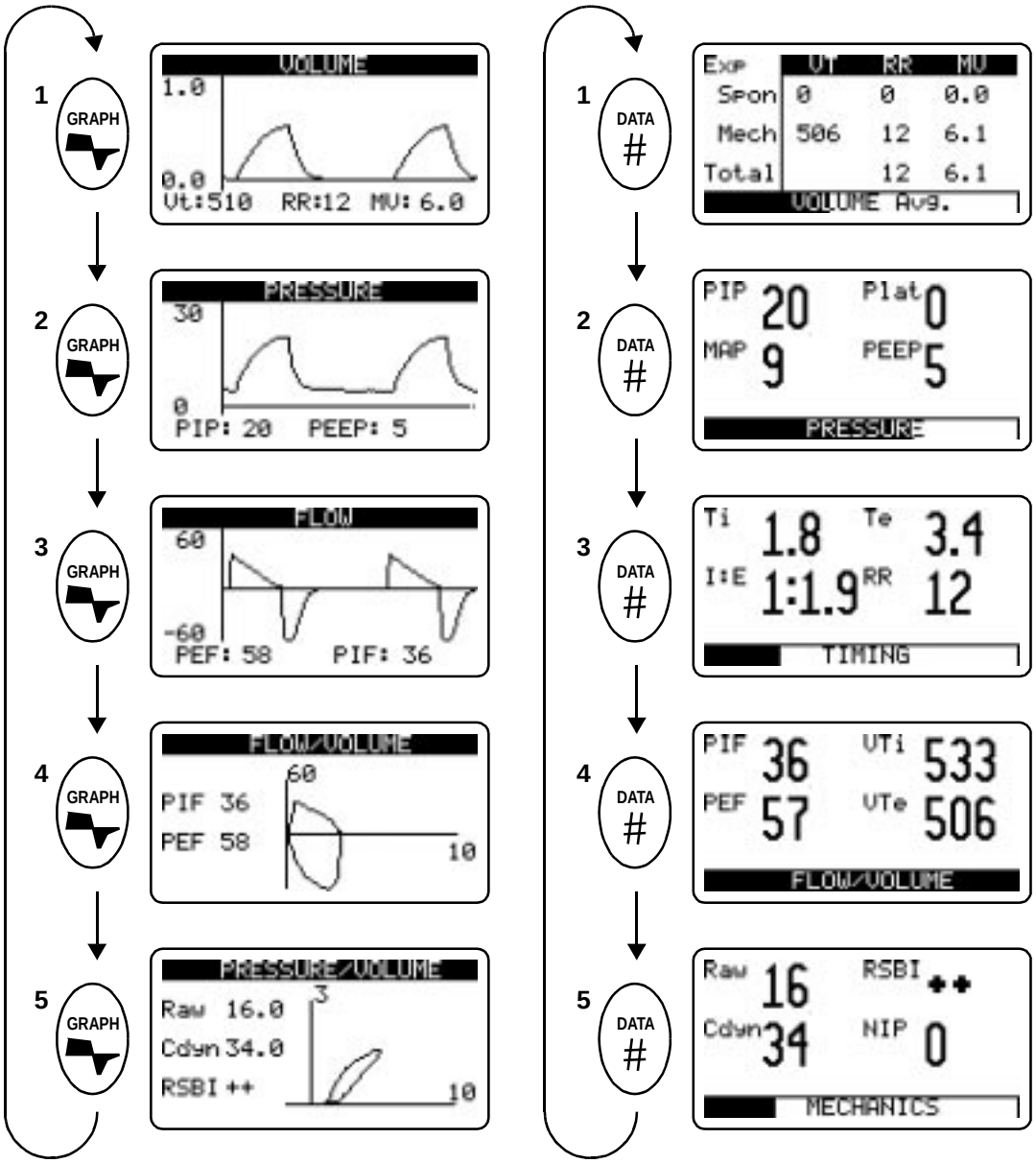
Patient Disconnect

VENT✔ does NOT provide audible alarms and will not alert the user to inadvertent disconnection of the flow sensor from either the breathing circuit of the monitor's sensor input connector.

> **NOTE**
>
> To limit circuit volume loss and avoid excessive moisture build-up in the flow sensor tubing, disconnect the flow sensor from the breathing circuit before disconnecting the flow sensor from the monitor.

Screen Display Flowchart

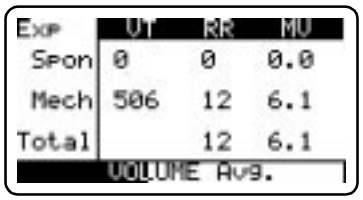
10. Press the GRAPH or DATA keys and the most recently viewed data or graph screen appears in the display. Additional key presses cause *VENT✔* to sequence through the available data screens as shown below.



DATA Display Screens

Each of the data screens is shown below.

1 DATA #

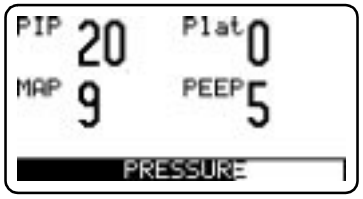


VOLUME DATA

- Spon - spontaneous breath, Mech - mechanical breath.
- Values from rolling 8-breath average.
- Activity bar is breath-by-breath using Volume Graph scale.

---

2 DATA #

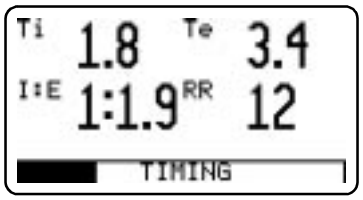


PRESSURE DATA

- Breath-by-breath reporting.
- If auto-PEEP is detected, the word "auto" appears under PEEP and the display reflects total PEEP present.
- Activity bar is breath-by-breath using Pressure Graph scale.

---

3 DATA #

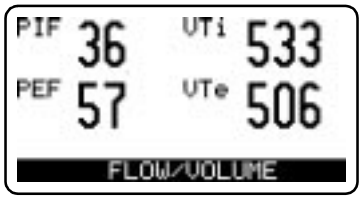


TIMING DATA

- Breath-by-breath reporting.
- Activity bar is breath-by-breath using Flow Graph scale.

---

4 DATA #

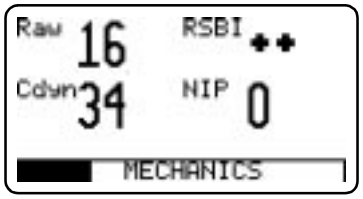


FLOW/VOLUME DATA

- Breath-by-breath reporting.

---

5 DATA #



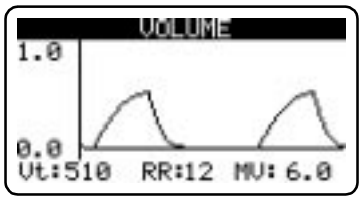
MECHANICS DATA

- Breath-by-breath reporting.
- RSBI - Pediatric/Adult sensor in use, blank when Neonatal sensor in use.
- Activity bar is breath-by-breath using Flow Graph scale.

GRAPH Display Screens

Each of the graph screens is shown below.

1 GRAPH

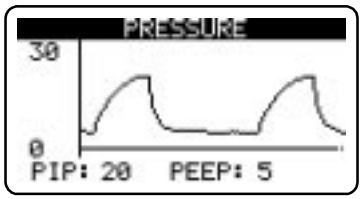


VOLUME GRAPH

- Automatically scaled.
- Breath-by-breath reporting.

---

2 GRAPH

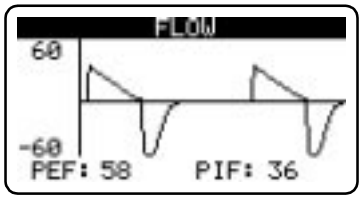


PRESSURE GRAPH

- Automatically scaled.
- Breath-by-breath reporting.

---

3 GRAPH

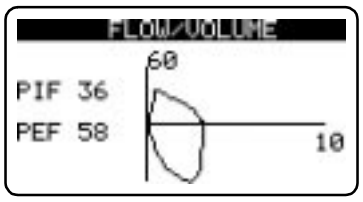


FLOW GRAPH

- Automatically scaled.
- Breath-by-breath reporting.

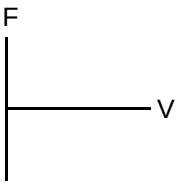
---

4 GRAPH



FLOW/VOLUME GRAPH

- Automatically scaled.
- 4 breaths overlayed then cleared.
- Breath-by-breath.



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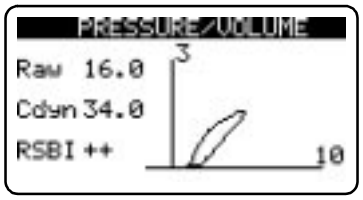
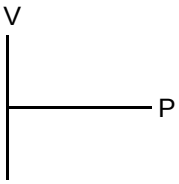
5 GRAPH



PRESSURE/VOLUME GRAPH

- Automatically scaled.
- 4 breaths overlayed then cleared.
- Breath-by-breath.
- RSBI - Pediatric/ Adult sensor in use, blank when Neonatal sensor in use.



System Errors

If *VENT✔* detects that a system error has occurred, patient monitoring is interrupted and an error message is displayed. Correcting the error condition will clear the error message from the display and monitoring will resume. The CALL SERVICE messages cannot be cleared from the display without power cycling the monitor.

The following errors are possible;

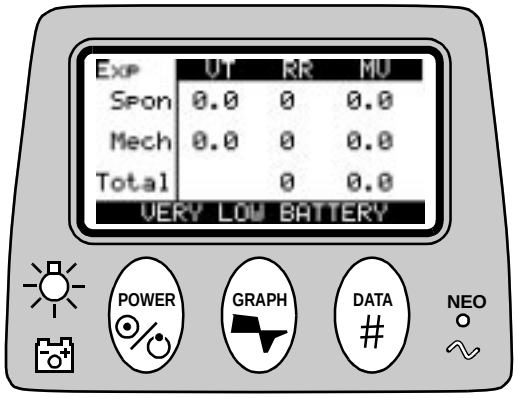
Error Message	Possible Cause	Corrective Action
CALL SERVICE	Faulty monitor or sensor.	Remove monitor and flow sensor from use. Contact qualified service personnel and note number shown in triangle.
INVALID SENSOR TYPE	Incorrect sensor type connected.	Replace sensor with a valid sensor type, pediatric/adult or neonatal.
	Damaged sensor.	Connector is damaged. Replace sensor.
	Damaged monitor.	Monitor's sensor connector is damaged. Remove from use and contact qualified service personnel.
FLOW OUT OF RANGE	Flow rate greater than 180 L/min.	*VENT*✔ does not operate with flow rates in excess of 180 L/min.
PRESSURE > 120 CM H_2O	Pressures >120 cm H_2O were detected.	Do not expose monitor/sensor to pressures in excess of 120 cm H_2O.

Parameter Alerts

VENT✔ does not provide audible or visible parameter alerts.

Battery Alert

VENT✔ monitors, and indicates to the user, the remaining battery capacity. The battery indicator illuminates GREEN to indicate a charged battery, slowly flashes YELLOW to indicate capacity is getting low, and quickly flashes RED to indicate the battery will become exhausted within 10-15 minutes. When the battery indicator flashes RED, VERY LOW BATTERY appears in the title stripe area of the display (example at right).



Cleaning and Disinfecting

- Turn *VENT*✔ off before cleaning. Do not immerse the monitor. Do not attempt to sterilize the monitor.
- The monitor can be cleaned and disinfected with solutions such as isopropyl alcohol 70% solution, 2% glutaraldehyde solution, or bleach 10% solution, then wiped with a clean water dampened cloth to rinse and dry before use.
- Treat Series 3 Flow Sensor in accordance with established protocol for single-patient use items.

Parameter List

Parameters reported by the *VENT✔* are summarized below.

Abv.	Units	Parameter
Cdyn	ml/cmH_2O	Dynamic Compliance
I:E		Inspiratory:Expiratory Ratio
MAP	cmH_2O	Mean Airway Pressure
MV	Liters	Minute Volume
NIP	cmH_2O	Negative Inspiratory Pressure
PEEP	cmH_2O	Positive End Expiratory Pressure
PEF	LPM (L/min)	Peak Expiratory Flow
PIF	LPM (L/min)	Peak Inspiratory Flow
PIP	cmH_2O	Peak Inspiratory Pressure
Plat	cmH_2O	Plateau Pressure
Raw	cmH_2O/L/sec	Airway Resistance
RR	br/min	Respiratory Rate
RSBI	br/min/L	Rapid Shallow Breathing Index
Te	sec	Expiratory Time
Ti	sec	Inspiratory Time
VT	ml	Tidal Volume (Averaged)
VTi	ml	Tidal Volume Inspiratory
VTe	ml	Tidal Volume Expiratory

Specifications

Below are specifications for the Novametrix *VENT✔* Handheld Respiratory Mechanics Monitor, Model 101. These specifications are listed for informational purposes only, and are subject to change without notice.

Principle of Operation

Fixed orifice differential pressure pneumotach. No calibration required.

Flow Sensors

Series 3 Flow Sensors, Single Patient Use

ET Tube Size	Series 3 Flow Sensor	Catalog No.
≥6 mm	Pediatric/Adult	6717
4.5-5.5 mm	Pediatric/Adult if weight ≥10 kg and V_T ≥100 ml Neonatal if weight <10 kg or V_T <100 ml	6717 6718/6720
≤4 mm	Neonatal	6718/6720

Flow:

- Range: Adult Sensor: ± 2 to 180 L/min.
  Range: Neonatal Sensor: ± 0.25 to 35 L/min.
  Accuracy:
  Greater of ± 0.5 L/min or 5% of reading (pediatric/adult sensor).
  Greater of ± 0.125 L/min or 5% of reading (neonatal sensor).

Pressure:

- Range: −120 to 120 cmH_2O
  Accuracy: Greater of ± 0.5 cmH_2O or 2% of reading.

Respiratory Rate

- Range: 0 to 120 br/min
  Accuracy: ±1 br/min
  Resolution: 1 br/min

Sensor Type Identification: Automatic.

Automatic Barometric Pressure Compensation: 400-800 mmHg.

Physical

VENT✔ monitor

- Size (maximum height, width, depth): 20 × 9.5 × 4.8 cm (8 × 3.75 × 1.875 in.).
- Weight (typical):
  without battery: 370 grams, (13 oz.),
  with alkaline battery pack: 595 grams (21 oz.),
  with rechargeable battery: 710 grams (25 oz.).
- Operating Environment:
  +10 to +40° C (50-104° F), 10 to 90% relative humidity non-condensing.
- Transport/Storage Environment:
  -10 to +55° C (14-131° F), 10 to 95% relative humidity non-condensing.

Display

Liquid Crystal Display

- 128 × 64 pixels, 2.5 × 1.25 inches.
- Adjustable contrast with backlight and plastic shield.

Indicators	LED indicators • Remaining battery capacity (green, yellow, red). • Neonatal flow sensor connected (green).
Alerts	Alerts for measured patient parameters: None. Very low battery alert: audible and visual.
AA Alkaline batteries	Panasonic AM3X or equivalent, (7 required). • Type: AA, Alkaline, 1.5 vdc, 1500 mAH. • Continuous battery life: 8 hours minimum at 21 °C (70 °F). • Up to 85% capacity remaining after 4 years storage at 21 °C (70 °F). • Recharge: Disposable, do not recharge.
Rechargeable Battery:	Duracell® DR30 or equivalent • Type: DR30, Nickel-Metal-Hydride (NiMH), 7.2 vdc, 2400 mAH, >250 cycles. • Continuous battery life: 12 hours minimum at 21 °C (70 °F). • Up to 70% capacity remaining after 30 days storage at 21 °C (70 °F). • Charge Conditions: 0 to 45 °C (32 to 113 °F). • Discharge Conditions: -20 to 50 °C (-4 to 122 °F). • Recharge time: 1.5 hr with external charger.
External Battery Charger:	Charger compatible with Duracell® DR30 or equivalent battery • Storage Conditions: -40 to +70 °C (-40 to 158 °F). • Operating Conditions: 0 to 50 °C (32 to 122 °F); optimum +25°C (77 °F). • Recharge time: 1.5 hour typical

Accessories

Cat. No.	Description
Monitor (English language)	
6800-00	*VENT*✔ Handheld Respiratory Mechanics Monitor, Model 101
6800-23	User's Manual
6800-90	Service Manual
	VENT✔ Quick Guide Inservice Video
420037	VHS video tape, NTSC format (U.S.A.)
420038	VHS video tape, PAL format
420039	VHS video tape, SECAM format
Flow Sensors	
6717-00	Series 3, Pediatric/Adult Flow Sensor. 10/Box
6718-00	Series 3, Neonatal Flow Sensor. 10/Box
6720-00	Series 3, Neonatal Combined CO_2/Flow Sensor. 10/Box
Power Options	
6862-00	Battery Case for AA Batteries (batteries not included)
400038	Alkaline Battery, 1.5 vdc, AA Size (Panasonic AM3X or equivalent)
400043	Rechargeable Battery, NiMH, 7.2V, 2.4AH, (Duracell® DR30 or equivalent)
400049	External Battery Charger (DR30), Universal Voltage, NiMH (power line cord not included)
600026	Power Line Cord, 120 vac, (U.S.A.) for External Battery Charger
Miscellaneous	
140084	Pole/Shelf Mount Kit
315107	Carrying Case

Warranty

Equipment manufactured or distributed by Novametrix Medical Systems Inc., is fully guaranteed, covering materials and workmanship, for a period of one year from the date of shipment, except for certain disposable products and products with stated guarantees other than one year. Novametrix reserves the right to perform guarantee service(s) at its factory, at an authorized repair station, or at the customer's installation.

Novametrix' obligations under this guarantee are limited to repairs, or at Novametrix' option, replacement of any defective parts of our equipment, except fuses, batteries, and calibration gasses, without charge, if said defects occur during normal service.

Claims for damages during shipment must be filed promptly with the transportation company. All correspondence concerning the equipment must specify both the model name and number, and the serial number as it appears on the equipment.

Improper use, mishandling, tampering with, or operation of the equipment without following specific operating instructions will void this guarantee and release Novametrix from any further guarantee obligations.

Service Department

For factory repair service:
Call toll free: 1-800-243-3444
To Call Direct: (203) 265-7701
Facsimile (203) 284-0753
http://www.novametrix.com
techline@novametrix.com

Caution: Federal (U.S.A.) law restricts this device to sale, distribution, or use by or on the order of a licensed medical practitioner.

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